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ELECTRIC VIBRATIONAL TOOTHBRUSH
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- (56) Prior Art Documents  
AU 17684/92 A61C 17/34 A48B 13/02
- (57) Claim

1. An electrical vibrational toothbrush comprising:
- an electric micro-motor with an eccentric mass inside a plastic front handle which generates high frequency vibration;
- a battery cassette formed at the rear handle which is detachably fitted to the front handle;
- a removable brush having an end portion rigidly and detachably attached to the front handle and another end portion, with soft bristles, which is free to vibrate,
- wherein the soft bristles vibrate, at the brush's resonant frequency propagated from the micro-motor with an eccentric mass, to disrupt and remove soft plaque and plaque colonies without scrubbing.

AUSTRALIA

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**ORIGINAL  
COMPLETE SPECIFICATION  
PETTY PATENT**

Invention Title: Electric Vibrational Toothbrush

The following statement is a full description of this invention, including the best method of performing it known to me:-

## ELECTRIC VIBRATIONAL TOOTHBRUSH

This invention relates to an electric vibrational toothbrush.

The manual toothbrush that people normally use  
5 was introduced by the Chinese in the 15th century.  
Today toothbrush bristles are made of nylon  
monofilaments. Toothbrush efficacy in mechanical plaque  
control can be effected by methods of use and an  
individual person's ability to brush. The methods of  
10 use may be difficult to teach in a standard way. A  
study of the use of manual toothbrushes concluded that  
tooth surfaces were unlikely to have adequate plaque  
removed.

In accordance with the present invention there is  
15 provided an electric vibrational toothbrush comprising:

an electric micro-motor with an eccentric mass  
inside a plastic front handle which electric micro-motor  
generates high frequency vibration;

a battery cassette formed in the rear handle  
20 which is detachably fitted to the plastic front handle;

a removable brush having an end portion rigidly  
and detachably attached to the plastic front handle and  
another end portion, with soft bristles, which is free  
to vibrate

25 wherein the soft bristles vibrate, at the removable  
brush's resonant frequency propagated from the electric  
micro-motor with an eccentric mass, to disrupt and  
remove soft plaque and plaque colonies without scrubbing.



Preferably, the eccentric mass is made of elastic material and utilizes different eccentricity and weight to produce various amplitudes of vibration.

More preferably, the removable brush is made of  
5 bendable elastic materials and can easily be replaced.

An electric vibrational toothbrush according to the invention will now be described in detail with reference to the drawings which show one example of the invention wherein:

10 Figure 1 is a side view of an electric vibrational toothbrush in accordance with the present invention,

Figure 2 is a sectional side elevational view of the toothbrush of Figure 1, and

15 Figure 3 is an exploded view of the toothbrush of Figure 1, showing a sectional side elevational drawing of the three main parts of the toothbrush, a removable brush, a front handle and a rear handle.

Figure 4 is an electric circuit diagram of the  
20 toothbrush of Figure 1.

This present invention is a device to provide an electric vibrational toothbrush 10 for daily use at home.

It can clean off soft plaque colonies so that the  
25 formation of calculus and gum disease can be minimized or prevented.

When the user pushes a magnetic switch 11 on the handle portion 12, the motor 13 with eccentric mass 24

rotates to produce a high frequency vibration. The resonant frequency vibration of the brush 14 can be produced during propagation so that the maximum displacement of the bristles 15 occurs at the free end 16 of the brush 14. Since the bristles 15 are soft, they can be used in the area between the teeth and gum in order to scrub off newly formed plaque without injuring periodontal tissue. When the bristles 15 are brought into contact with the teeth and light pressure is applied, without scrubbing, the high resonant frequency vibration delivers the ultimate efficiency in cleaning. The toothbrush 10 is useful in the oral health care of both adults and children, especially for physically and mentally handicapped persons.

The brush 14 is detachable from the handle 12. Therefore, it can be changed for different users or renewed once it is worn.

As shown in the Figures 2 and 3, the brush 14 has an arch shape 17 and unequal cross-section along the longitudinal axis, and is made of bendable elastic materials. Bristles 15 are implanted in the free end 16 of the brush 14. The other end 18 has a square cross-section which is removable and rigidly fitted into the detachable insertion 19, forming a replaceable brush 14.

A battery 20, 1.5 volts and AA size, loaded inside the rear handle 21 has a negative electrode 27 to the micro-motor 13 through a spring 28 and a switch 11,

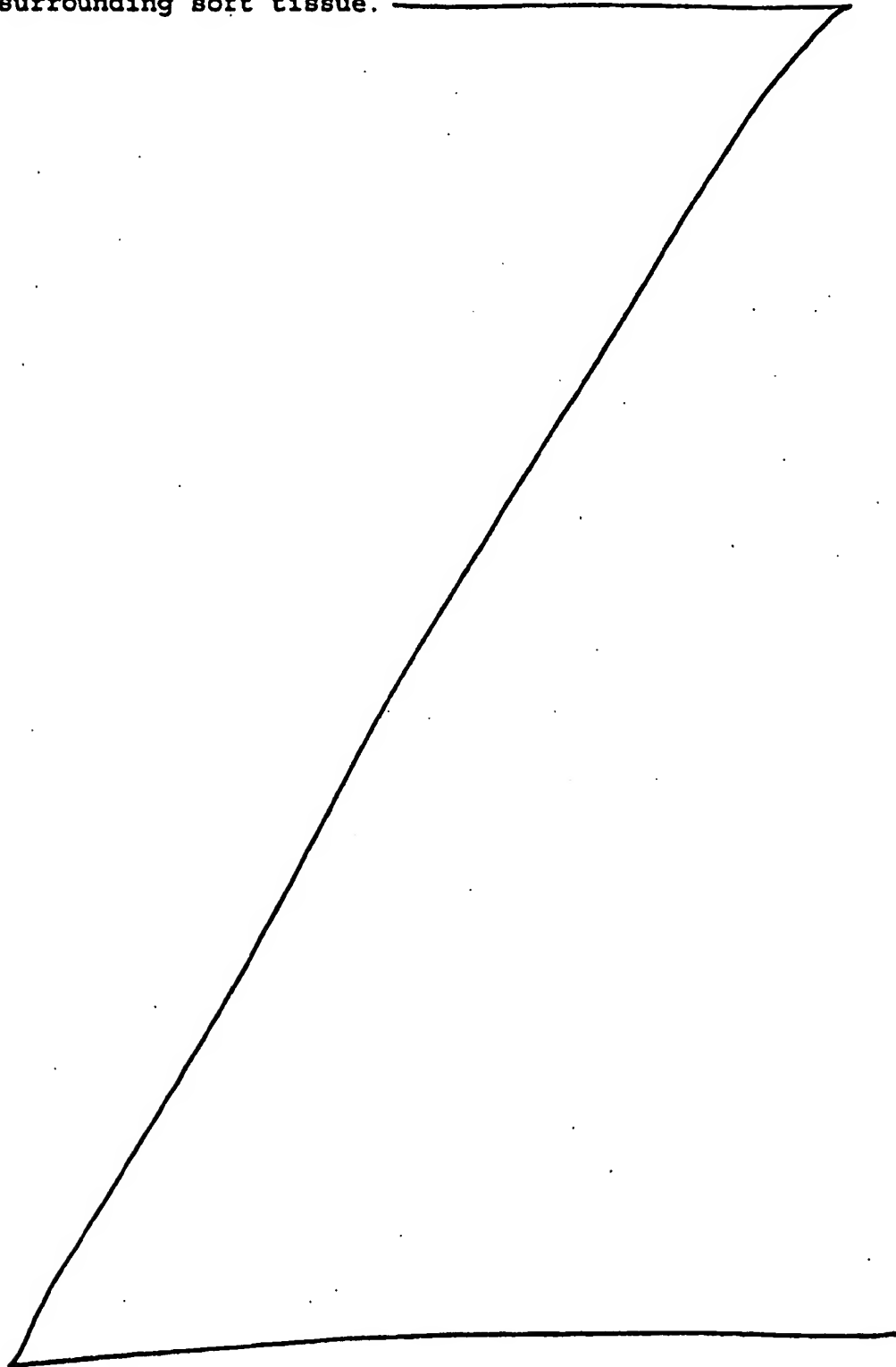
and has a positive electrode 29 connected to the rear of the micro-motor 13, when the rear handle 21 is detachably fitted into the front handle 22, as can be seen in Figure 2.

5           The micro-motor 13 is firmly mounted by four support plates 23 running longitudinally inside the front handle 22. An eccentric mass 24 is fitted into a shaft 25 of the micro-motor 13 as shown in Figure 2. The present invention utilizes different eccentric mass  
10 24 by changing the eccentricity and weight to produce various amplitudes of vibration to suit the needs of adults and children based on their sensation, so that users can clean all parts of the teeth comfortably and safely.

15           The eccentric mass 24 is made of elastic material, which protects the micro-motor 13 from vibration while it is being used. The micro-motor 13 is supported by plastic plates 23, which can absorb the vibration in the handle 12. Therefore, the users will  
20 not feel the uncomfortable effects of the vibration.

As the micro-motor 13 rotates in a high speed, the eccentric mass 24 creates an even centrifugal force, which results in high frequency vibration, propagating to the brush tips 26. The brush 14 is driven at its  
25 resonant frequency which is defined by the length and mass of the brush 14. The vibration causes the soft bristles 15 to move on the tooth surfaces and into the interproximal areas. It is sufficient to disrupt and

remove both soft supragingival plaque and soft  
subgingival plaque from the teeth without harming the  
surrounding soft tissue.



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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. An electrical vibrational toothbrush comprising:  
an electric micro-motor with an eccentric mass  
inside a plastic front handle which generates high  
5 frequency vibration;  
a battery cassette formed at the rear handle  
which is detachably fitted to the front handle;  
a removable brush having an end portion rigidly  
and detachably attached to the front handle and another  
10 end portion, with soft bristles, which is free to  
vibrate,  
wherein the soft bristles vibrate, at the brush's  
resonant frequency propagated from the micro-motor with  
an eccentric mass, to disrupt and remove soft plaque and  
15 plaque colonies without scrubbing.
2. The toothbrush of claim 1 wherein the eccentric  
mass is made of elastic material and utilizes different  
eccentricity and weight to produce various amplitudes of  
vibration.
- 20 3. The toothbrush device of claim 1 wherein the  
removable brush is made of bendable elastic materials  
and can easily be replaceable.

  
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ZHEN HUI LI

31 March 1994  
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DATE



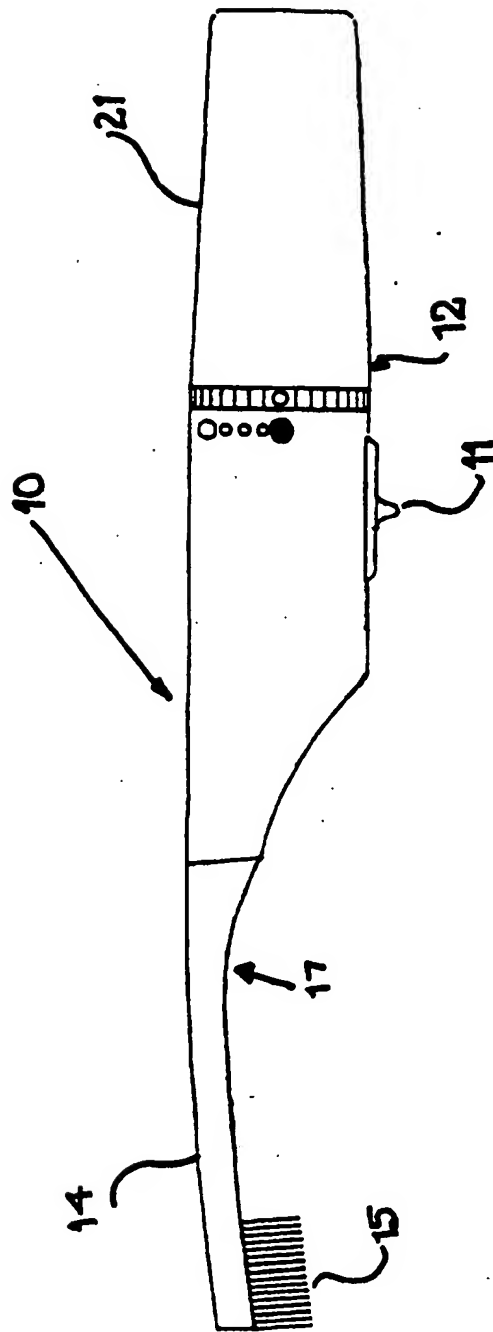


Fig. 1

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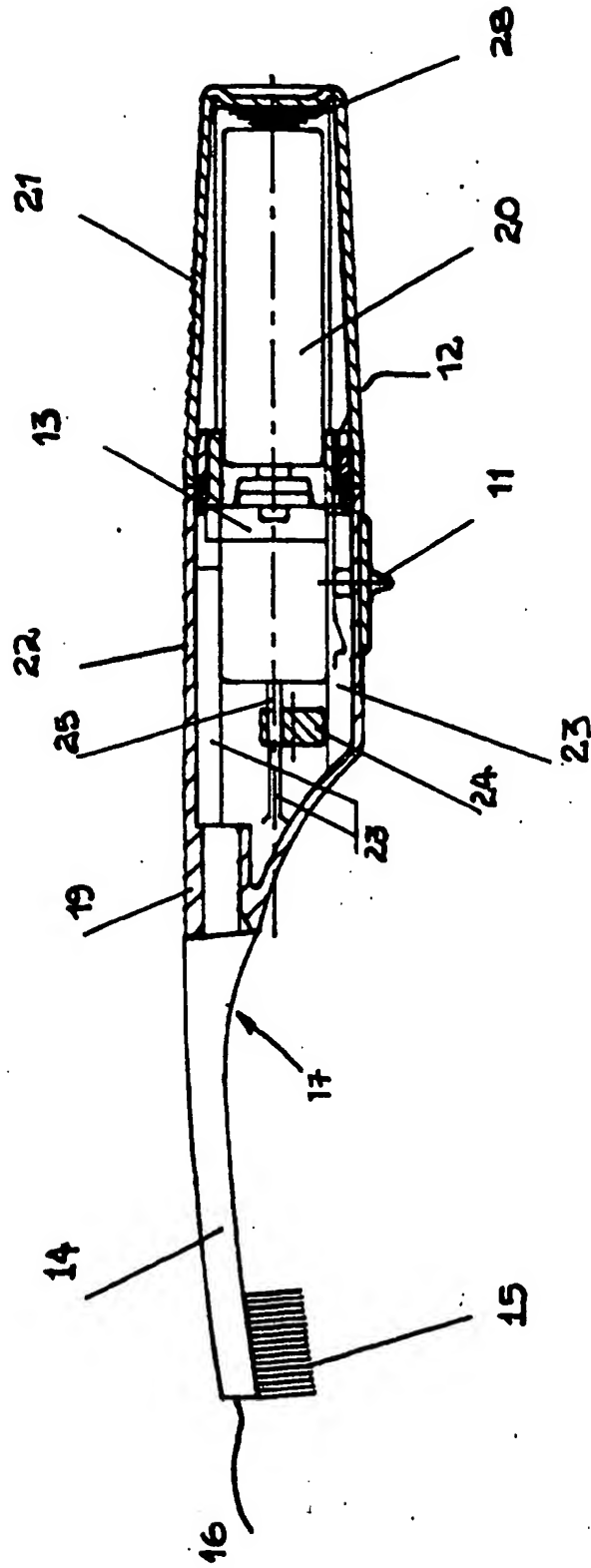


Fig. 2

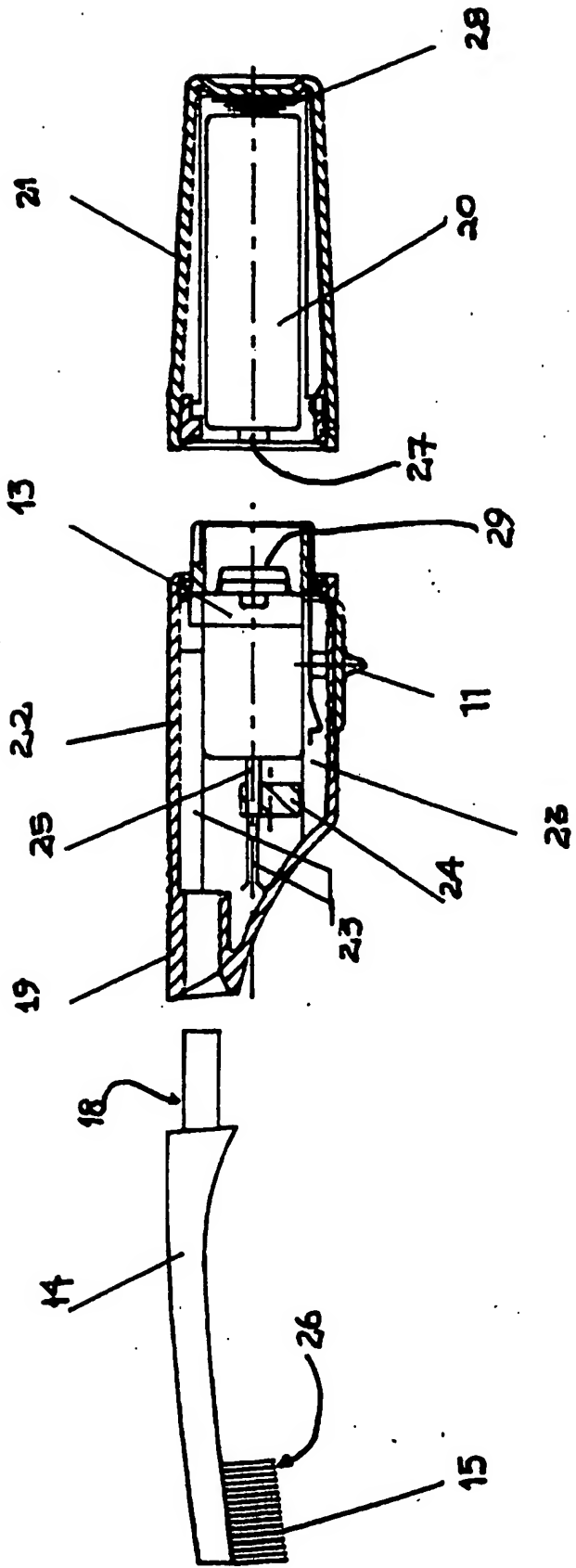


Fig. 3

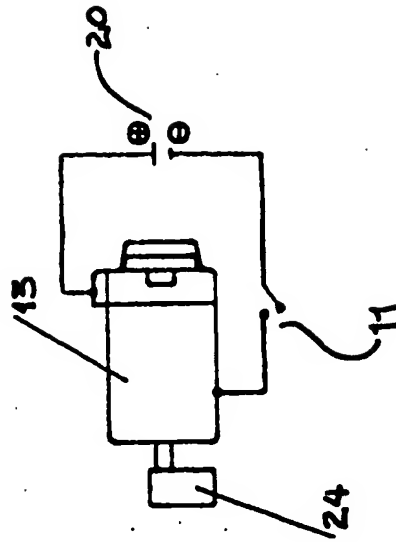


Fig. 4